N A E B

TV Engineering Newsletter

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS

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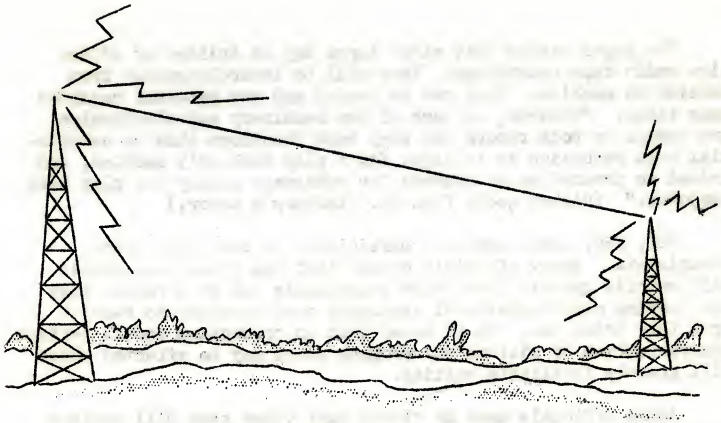
We invite your attention to the table of contents above, which with the exception of the article on page 12, consists of Technical Tips columns from the regular NAEB Newsletter. We'd like to include more original material but unfortunately people don't send it to us although they promise, so again we ask you to help.

We believe you'll be interested in the Canadian Broadcasting Corporation paper included herein. We have another from CBC on "Standardization and Control of the Kinescope Recording Process" which is not included due to its length and more limited appeal. However, we'll send it to you upon request.

Cecil S. Bidlack
October 12, 1956



TV Technical Tips No. 22
by
Cecil S. Bidlack, NAEB TV Engineer

When the May Newsletter was mailed to NAEB members a report was included on the Ampex Video Tape Recorder. At about the time of this mailing, Charles P. Ginsberg, project engineer for the new Ampex machine, prepared a paper which was presented May 2 at the Convention of the Society of Motion Picture and Television Engineers in New York. The paper was presented by Ross H. Snyder and gave a brief history of the project and a discussion of the applications for which it was designed.

Mr. Snyder emphasized that the machine was designed specifically for the purpose of program delay. This explains why it first will be used by CBS and NBC to overcome the 3 hour East-West time difference. The use of video tape for this purpose will result in improved quality of both picture and sound and reduced annual operating costs.

Another point stressed in this paper was the fact that the usefulness of the video tape equipment for other purposes will be determined from the experience gained with the equipment in actual operation by the networks who have purchased prototype models for delivery this summer. Ampex officials caution that too much may be assumed too soon regarding its applications both within and outside the television industry.

The paper states that video tapes may be spliced or edited like audio tape recordings. They will be interchangeable from machine to machine. They can be erased and new material recorded many times. "However, so much of the machinery and electronics are common to both record and play back functions that no substantial cost reduction is in sight for a play back only machine, and indeed no production is planned for equipment solely for play back purposes." (Direct quote from Mr. Ginsberg's paper.)

CBS, NBC, and Ampex will participate in the application experiments. Ampex officials expect that the production models will benefit greatly from these experiments and as a result they are leaving many operational standards open in order to benefit from this trial use. It is hoped that on production models perfect syncronization of picture and program sound may be effected which will greatly facilitate editing.

Ampex officials make no claims that video tape will replace high quality 35 mm film. They state that the best video picture quality is not comparable with good original film. However they do forsee an application in motion picture production. Sequences may be shot simultaneously on film and on tape and the tape immediately played back for review without the delay necessitated by processing. This should result in a considerable monetary saving in motion picture production, although for this application too there are many problems to be solved.

Mr. Snyder stated that a full engineering report, display and demonstration of the Ampex Video Tape Recorder will be presented by Mr. Ginsberg at the Fall Convention of the Society of Motion Picture and Television Engineers which will be held in Los Angeles, October 8-12, 1956.

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From reports received from 31 engineers attending, the NAEB Radio and Audio Engineering Seminar was an unqualified success. One of the indications of its success was the desire, expressed by practically all of those present, that future seminars of a similar nature be held annually or at least every two years. Many indicated a willingness to pay their own expenses to future meetings.

The Seminar was made possible by a grant from the W. K. Kellogg Foundation and was May 27 through June 1 at Allerton Park, the conference center of the University of Illinois - in a setting of scenic beauty, far removed from any distractions. Many remarked that Allerton House was an ideal place to hold such a meeting. The group lived, ate, and met together for five days. In this way plenty of opportunity was provided for the exchange of ideas and the sharing of experiences as well as getting acquainted with others in educational radio stations.

Those attending also got better acquainted with NAEB and its many services to members. President Frank Schooley got us off to a good start on Sunday evening. Executive Director Harry Skornia and Network Manager Bob Underwood filled in with other details on Monday. Keith Ketcham, Bob Higgy, Carl Menzer, and John Brugger of the NAEB Engineering Committee were on the program. Other speakers (see June Newsletter) provided authoritative technical information in their respective fields to complete a well rounded program for the week.

Geographically NAEB member stations were represented from Massachusetts to California, Oregon to Florida, and Texas to Minnesota. A high degree of interest was maintained throughout and the participants, as a group, contributed much to the success of the program by their comments and questions directed to the program speakers.

It is hoped that the first Radio and Audio Engineering Seminar is only the beginning of a series of meetings of technical personnel. We hope that some way can be found so that all who apply may attend.

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Samuel H. Barbour has been recently appointed Chief Engineer of WHYY-TV of the Metropolitan Philadelphia Educational Radio and Television Corporation. He writes to say that they expect to be on the air on Channel 35 this fall.

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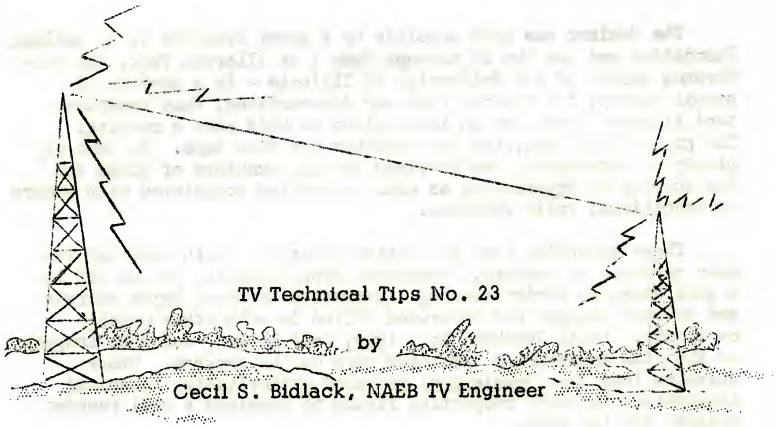

TV Technical Tips No. 23

by

Cecil S. Bidlack, NAEB TV Engineer

The NAEB Engineering Committee has discussed the possibility of establishing a pool of test equipment which might be available for use of NAEB members. It is often desirable and sometimes necessary for stations to use test equipment not normally owned by every radio and television station. For instance, a field strength meter is not equipment needed for routine maintenance of transmitting equipment. Certainly every station sometime has wished it could make a few field strength measurements or run at least four radials to get a rough idea of its field pattern.

The Committee is not proposing the NAEB purchase such equipment; some stations have test equipment they would be willing to loan to others nearby. So the Committee has proposed that a questionnaire be sent to all NAEB radio and TV stations. These stations would list the test equipment available. The data returned would be compiled into an inventory of test equipment. By referring to such an inventory, the location of the test equipment you need could be determined and a telephone call could make the necessary arrangements for its loan.

Perhaps you would be hesitant to loan a $2,500 field strength meter; yet it has been done, the measurements made and the meter returned in first class shape. The Committee feels the plan will work, especially if the chief engineers concerned know each other.

This raises the question, "How do I get to know the other NAEB engineers?" To date, there have been two NAEB-sponsored television engineering workshops and the recently concluded radio engineering seminar at Allerton Park. This makes a total of 80 NAEB engineers who have had an opportunity to get acquainted with those who attended a workshop or seminar. Another way would be for engineers to take a more active part in NAEB activities by attending NAEB regional meetings and the annual NAEB Convention held in October of each year.

The Engineering Committee has spent considerable time discussing professional advancement and recognition of technical personnel. They have done something about technical advancement through the workshops and seminars. Recognition is something else, and the writer believes this is something which has to begin with the person concerned. We believe progress is made along this line. We see educational station engineers at annual meetings of the Institute of Radio Engineers, Society of Motion Picture and Television Engineers and the Audio Engineering Society. Many attended the equipment exhibit at the recent NARTB Convention in Chicago. To us this is an indication that our engineers are advancing professionally. Their station directors and managers know attendance at such meetings is stimulating and worthwhile. We know of one instance where an institution pays its chief engineer's professional society annual dues. The point is obvious. They must believe it is worth the expenditure.

Well, it looks as if we took the long way around to say you're going to receive a questionnaire asking what test equipment who have and what you'd like to use on a loan basis. We ask your cooperation in completing the form we send and promptly returning it.

* * * * * * * *

A new 16-mm test film that measures registration, aperture size, resolution, shutter timing, centering of the image, steadiness of its own test image with respect to the perforation, and also provides a "thousandths scale" for measuring film movement in double-exposure testing of printer steadiness has been announced by the Society of Motion Picture and Television Engineers. Providing in

a single test film of high accuracy several quantitative visual tests that have always been difficult to perform, this reel will be used in quality control by manufacturers of 16-mm printers, and for precise alignment of 16-mm black-and-white color television film chains.

Development work on the film was done over a period of two and a half years by George W. Colburn of Geo. W. Colburn Laboratories, Chicago. This test film, which comes in lengths of 100 ft. and is priced at $27.50, may be ordered from the Society of Motion Picture and Television Engineers, 55 West 42nd Street, New York 36, New York.

* * * * * * *

RCA's 23rd TV training seminar for engineers, featuring lectures on both monochrome and color TV has been scheduled for September 17-21 in Camden, New Jersey. Arrangements for attendance may be made through the RCA sales representative who calls upon your station.

* * * * * * *

John R. Brugger has resigned as Chief Engineer of WILL-AM-FM-TV to accept a position as coordinator and technical director of the recently announced closed-circuit public school television system being established by the Washington County Board of Education at Hagerstown, Md. This project, to run for five years, is being sponsored by RETMA, its member and non-member equipment manufacturers, the Fund for Advancement of Education and other educational groups and associations.

John will be missed at WILL and in the Champaign-Urbana community where he has been an active and willing worker in community organizations. We will miss his help at NAEB Headquarters and as a member of the NAEB Engineering Committee. We wish him the best in his new position.

* * * * * * *

RCA has announced that new image orthicons using 750 line "Micro-Mesh" screens, replacing current tubes with 500 lines, are now in quantity production. Improved quality is possible with the new tubes, since the 750 line mesh is said to eliminate all traces of bothersome moire patterns. The grid is so fine the mesh openings comprise more than 60% of screen area. Two types are available -- 5820 for monochrome and 6474 for color cameras.

* * * * * * *

DuMont has been putting on a "Price-Buster" sales campaign with some excellent buys on television equipment. We hope some of our stations have been able to take advantage of these price reductions of equipment listed in the circular postmarked June 26. Ken Petersen has been following up this opening blast with some very clever post cards to those on his mailing list.

* * * * * * *

Speaking of mailing lists, many manufacturers of equipment and components publish helpful technical pamphlets and will be glad to have your name on their mailing list. We can't hope to list them all, but here are a few:

General Radio EXPERIMENTER, monthly
SOUND TALK - Minnesota Mining and Manufacturing Co., periodical
BROADCAST NEWS - RCA Manufacturing Co., bi-monthly
AUDIO RECORD - Audio Devices, Inc., periodical
H-P JOURNAL - Hewlett Packard Co., monthly
THE NOTEBOOK - Boonton Radio Corp., quarterly
MAGNETIC MUSE - American Electronics, Inc., periodical
THE CAPACITOR - Cornell Dubilier Electric Corp., monthly
HIGHLIGHTS - General Precision Laboratory, bi-monthly
DU MONT DISPATCH - Allen B. Du Mont Laboratories, monthly

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HELP

Joe Stuckey, Chief Engineer of the Broadcasting Services at the University of Alabama, sends a request for information on the Kinevox 16-16mm synchronous magnetic film recorder. Unfortunately we had no information to supply. Perhaps some of our readers know of this equipment and can supply Joe with information about it. Write to him at Box 2002, University, Alabama, with a copy to us.

* * * * * * * *

We have just received a letter from Larry Brogger, Chief Engineer of KUOM from which we'll quote:

"I am writing you with the hope that you might be able to help me locate an engineer for our organization here at KUOM. I have tried for several months locally but to no avail. The position open is for a Junior Engineer whose duties are AM and TV Maintenance with some operating. This employee works with other Junior Engineers and directly under the Chief Engineer and his assistant.

If you know of anyone who would meet the qualifications of a maintenance engineer and is dissatisfied with his present position, I would be most happy to hear from him. Further information would be furnished in direct correspondence with the applicant."

* * * * * * * *

Radio Station WKAR has an opening for an Assistant Chief Engineer and has sent an inquiry to the NAEB Placement Service. Unfortunately the Placement Service has no names on file of technical personnel who would fit such a position. If you are seeking to better your present position, please get your name on file with the NAEB Placement Service.

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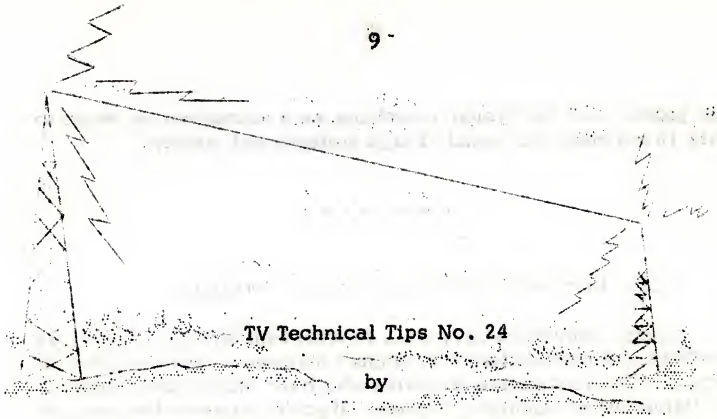


TV Technical Tips No. 24

by

Cecil S. Bidlack, NAEB TV Engineer

Does anybody know where the summer went? Deadline for September Newsletter copy is here and our folder isn't exactly bulging. That means summer is practically over and the fall rush is almost upon us.

We've just returned from three days spent at the University of Michigan Television Studio at the Lighting and Staging Workshop. We're sure that many of the participants returned to their home studios a bit envious of the fine television facilities provided by the State of Michigan. They also came away stimulated by their contacts with the consultants and others in the group. It was amazing to us to see how quickly a bare studio was transformed into the sets required by the staging problem of the workshop.

* * * * * * *

A new 16 mm magnetic multi-frequency test film is now available from the Society of Motion Picture and Television Engineers. Developed by the Society's Sound Committee, it covers a range of frequencies from 50 through 7,000 cycles per second and provides a much needed reference standard for measuring and adjusting the electrical characteristics of magnetic sound systems for motion pictures and television. This new test film is last in a series of standards and standardized test methods developed by SMPTE for the mo-

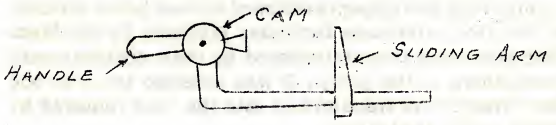
tion picture and television industries as a foundation on which to build 16 mm magnetic sound of high professional quality.

* * * * * * * *

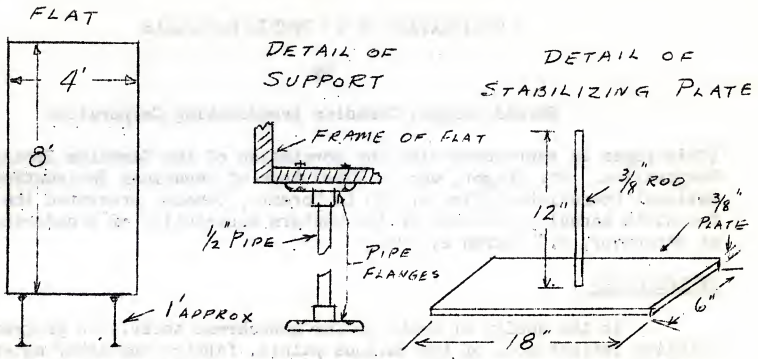
Notes from the TV Lighting & Staging Workshop:

Gould-Mersereau Co., Inc., 35 West 44th Street, New York 36 New York, are manufacturers of drapery hardware. They supplied the track and hangers for the draperies which run around three sides of the University of Michigan TV studio. If you're interested we suggest you write asking for their catalog.

Vern Weber is using a different type of scenery clamp than the screw type "C" clamp ordinarily seen in TV studios. It's called a Colts Clamp and is made by the Batavia Clamp Co., Batavia, N.Y. It comes in various sizes from 4-18 inches in length. Clamping action is effected by a cam instead of a screw; consequently its action is very fast. A sliding arm also makes the clamp adjustable for use in clamping objects of varying widths together. (see sketch)



Modular Units of scenery are also employed at the University of Michigan TV studio. These are constructed by building a frame of 1" x 3" wood covered with 4' x 8' sheets of upson board or plywood. No scenery jacks are used; instead 1/2" pipe 13 inches long and pipe flanges are employed which hold the flat approximately one foot off the floor. For stability a flat steel plate, 3/8" thick and 6" wide by 18" long to which 3/8" iron rods a foot long have been welded, are used. The pipes and bottom flange slide down over the rods and the plates are turned at right angles to the plane of the flat for stability. (see sketch on next page)



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KUON-TV, the University of Nebraska station at Lincoln, is seeking a Chief Engineer. They desire someone with television experience to assist architects in planning studio facilities and to select and install studio and microwave equipment. The station has been on the air since November 1, 1954 using studio facilities of a commercial station in Lincoln. Apply at once to:

Jack McBride
KUON-TV
University of Nebraska Television
Lincoln 8, Nebraska

* * * * * * *

We welcome Raymond Watson to educational television as Kinescope Recording Engineer at the University of Alabama Studios at Tuscaloosa. Mr. Watson formerly taught at Jacksonville State Teachers College and also was employed at WAGA-TV in Atlanta.

CALIBRATION OF TV STUDIO MATERIALS

by

Harold Wright, Canadian Broadcasting Corporation

(This paper is reproduced with the permission of the Canadian Broadcasting Corporation. Mr. Wright, who is Supervisor of Technical Instruction in the National Operations Office of CBC in Toronto, Canada, presented the paper at the Sixth Annual Conference of the Western Association of Broadcasters, held at Vancouver, B.C. March 2, 1956)

INTRODUCTION

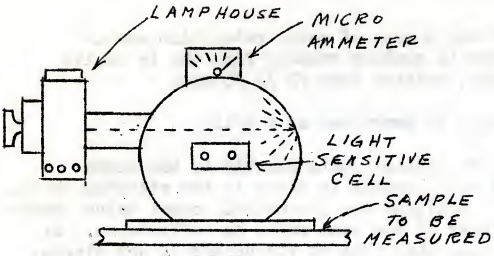
In the design of settings for monochrome television programs the relative reflectances of the various paints, fabrics and other materials must be known in advance if the original concept of the design is to be maintained. A constant problem is the confusion of color contrast with brightness differences. Two colors of quite different hue, but each having the same reflectance will be reproduced as a single shade of gray and the tonal separation between the two will be lost. This has happened many times in television studios, usually to the embarrassment of the designer and others. This points up the need for an easy means of determining the relative reflectances of the various materials used.

EARLIER METHODS

Originally, the method for calibrating materials required two or more cameras together with studio facilities and the RETMA gray scale. Samples of paints and fabrics were placed under flat light and the nearest matching gray scale step was chosen with reference to the control room picture monitor. This was a cumbersome system with too many variables to ensure high accuracy. Lighting, video control, camera tube age etc. all combined to produce at times somewhat misleading results. It was felt that if all materials could be measured by a single instrument, results would be much more uniform.

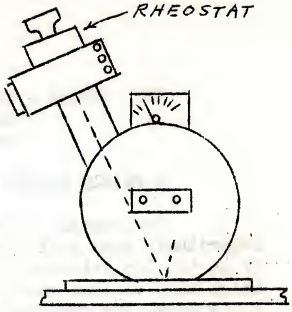
REFLECTOMETER APPROACH

The reflectometer, a device seldom found outside of research laboratories, will satisfy these requirements provided the instrument's color response matches that of the camera tube. One of the simplest of these devices is the Baumgartner Reflectometer. A ten inch hollow metal sphere with a three inch opening in the bottom is fitted with a pair of light-sensitive cells and a small microammeter. The inside of the sphere is painted with a highly reflective matt white paint so that it functions as a light integrating device. The light source is in the form of a small projector unit with lamp, condenser lens and objective lens. The main barrel of the unit is mounted on an offset swivel so that the light beam from the projector may be made to strike the wall of the sphere or bounce off a test sample under the bottom opening. These two conditions are illustrated in Fig 1 (a) and 1 (b). The brilliancy of the light source may be adjusted by means of a rheostat.



CALIBRATE POSITION

FIG. 1 (a)



MEASURING POSITION

FIG. 1 (b)

In operation, the sample to be measured is placed under the port and the lamp house placed as shown in Fig. 1(a). The rheostat is then adjusted to produce a full scale or 100 reading on the meter. The lamp house is then swivelled around to the position shown in Fig. 1(b). The meter then reads per-cent reflectance directly. Two things are important when such a device is used for calibration. The cells must have the same color response as the image orthicon and the results obtained will only hold good under conditions of flat light.

For the readings to be interpreted, they must be related to the standard RETMA gray scale and this has been done on the attached chart. The gray scales on the lithographed studio test pattern should not be used as a reference as they are somewhat inaccurate. Accurately calibrated sets of four small gray scales are available from RETMA and may be cemented over those on the test pattern.

THE MUNSELL SYSTEM

The reflectometer is a valuable device for checking samples of costumes, drapes and other properties but the problems of calibrating the thousands of color combinations possible with paint mixes becomes a difficult one. Various systems for the description and cataloging of color have been devised such as the Munsell system, the Ostwald system and others. The most useful one from the TV viewpoint is the Munsell system, where the relationship to the reflectance is obtainable.

In the Munsell system color is defined in three ways.

(1) Hue - which is the visible color such as red, green, blue, etc. and is designated R, G, B, etc.

(2) Value - which is the relative brightness of samples and may be translated into reflectance. It is designated by numbers from one to ten written thus 1/ 7/ 9/ and so on. The gradations in value represent equal visual differences.

(3) Chroma - which is the degree of color saturation and is designated by numbers running from two to twelve and higher, written thus /2 /4 /6 etc.

A fairly bright red would be described as R 4/12

The Munsell values may be related quite closely to the RETMA logarithmic gray scale and this relationship is shown in the attached chart. Of particular interest to the TV designer are the Munsell equal value charts which show various hues and chromas of the same value or reflectance. At one glance, the designer would know that none of the colors of any single chart could be combined in a setting where separation of tonal areas was required. If one of these equal value charts is placed before a TV camera all chips appear as the same shade of gray.

CONCLUSIONS

At a cost represented by the total cost of one reflectometer, one Munsell Library Edition and the new RETMA gray scale test pattern any TV station could be in a position to calibrate paints, fabrics and other materials without turning on a camera. Materials, particularly draperies could be measured before they were purchased, and set construction or props provided by outside commercial agencies could be checked before camera day. Paper and paste-up materials used by graphic arts groups could be pre-checked for tonal separation. It should be remembered that such calibrations will only be accurate for flat-lighting in the studio. Spotlight techniques may cause the contrast range in the studio to become greater or less than the calibration results would indicate.

RELATIONSHIP BETWEEN RETMA GRAY SCALE, REFLECTANCE AND MUNSELL NOTATION

NEW STANDARD R.E.T.M.A. GRAY SCALE (LOGARITHMIC)			NEAREST MUNSELL VALUE	MUNSELL REFLECTANCE FIGURES
78.6%	TENTATIVE FIGURE STEP 1 REFERENCE WHITE		9/	78.66%
60%	STEP 2		8/	59.10%
41.3%	STEP 3	SKIN TONES	7/	42.92%
28.4%	STEP 4		6/	30.05%
19.5%	STEP 5		5/	19.77%
13.4%	STEP 6		4/	12.00%
9.2%	STEP 7		3.5/	9.003%
6.3%	STEP 8		3/	6.555%
4.4%	STEP 9		2.5/	4.614%
3%	STEP 10 REFERENCE BLACK		2/	3.126%

Scanned from the National Association of Educational Broadcasters Records
at the Wisconsin Historical Society as part of
"Unlocking the Airwaves: Revitalizing an Early Public and Educational Radio Collection."

A collaboration among the Maryland Institute for Technology in the Humanities,
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and Wisconsin Historical Society.

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